



U.S. Department of Energy Energy Efficiency and Renewable Energy

Bringing you a prosperous future where energy
is clean, abundant, reliable, and affordable

Federal Energy Management Program

Achieving Sustainability Goals in the Federal Community



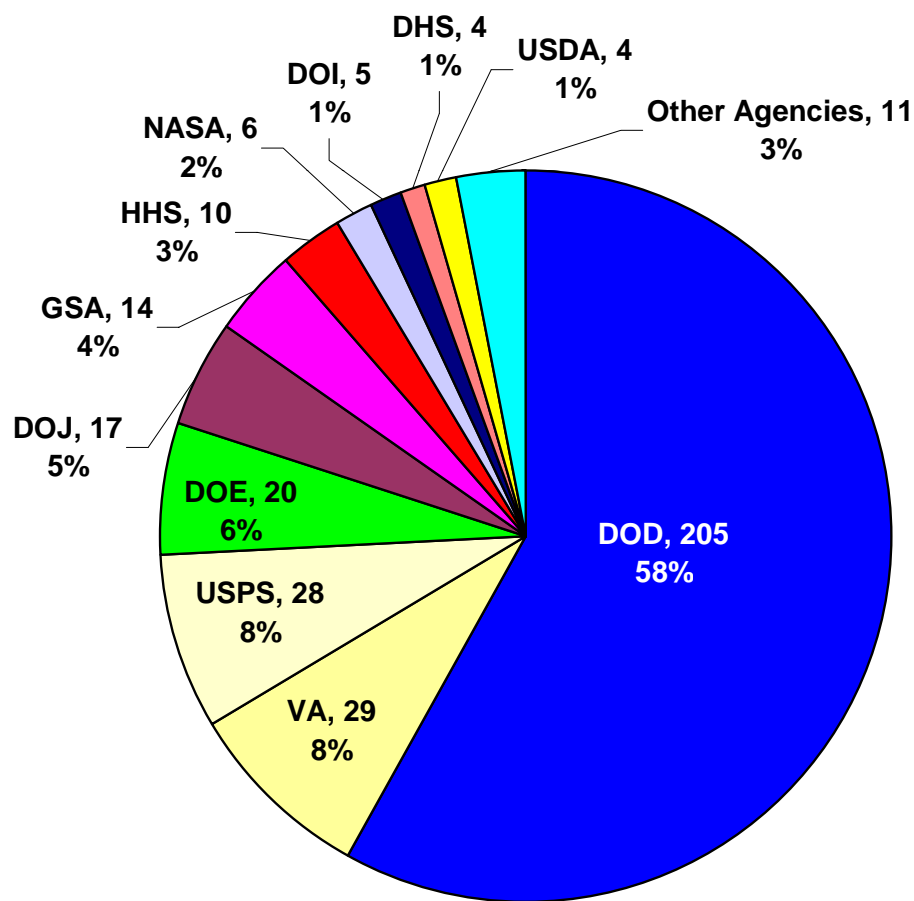
Matt Gray

DOE's Federal Energy Management Program
Chair, Interagency Sustainability Working Group

Green in the Military II, February 3, 2009



FY 2007 Annual Consumption in Facilities Subject to the EO/EISA Goal: 353.5 Trillion Btu





- **OMB A-11 (2002)** – Section 300 Planning, Budgeting, Acquisition, and Management of Capital Assets
- **EPACT, Section 109 (2005)**
- **OMB Scorecards**
 - Environmental, Energy, Transportation, Real Property
- **MOU on Federal Leadership in High Performance Sustainable Buildings (2006)**
- **EO 13423 and Implementing Instructions (2007)**
- **Energy Independence and Security Act (2007)**
- **Update to MOU on High Performance Sustainable Buildings (2008)**
- **2009?**



- Design for energy consumption 30% below -
 - ASHRAE 90.1-2004 (commercial & high-rise res)
 - 2004 IECC (low-rise residential)
- “if life-cycle cost-effective”
- Apply sustainable design principles to siting, design, and construction
- Does not include renovations
- DOE Rulemaking, effective Jan 22, 2008
 - Excludes plug load & process loads from base and from % savings (unlike ASHRAE 90.1 App. G)
 - If 30% not achievable, must try for less energy savings in LCC effective manner but must comply with applicable standard as a minimum
 - http://www1.eere.energy.gov/femp/pdfs/fr_notice_cfr433_434_435.pdf



- DOE to revise Federal building standards to require that the fossil fuel-generated energy use be reduced by:
 - 55% in 2010
 - 65% in 2015
 - 80% in 2020
 - 90% in 2025
 - 100% in 2030 (*Zero Carbon Buildings?*)
- **Exceptions** (must be approved): if technically impracticable in light of the agency's specified functional needs for that building
- Sustainable design principles shall be applied to the siting, design, and construction of buildings subject to the standards
- DOE to identify a certification system and level for green Federal buildings, in consultation with GSA and DOD



- **Effective 19 Dec, 2010**, Requires agencies to lease buildings that are EPA Energy Star labeled, with the following exemptions:
 - There is no space available in an Energy Star building that meets the agency's requirements
 - Agency proposes to remain in its current building
 - Agency leases space in a building of historical, architectural, or cultural significance (legal def)
 - The lease is less than 10,000 gross square feet
 - Lease contract requires all energy efficiency and conservation improvements that would be cost effective over the life of the lease
- **Section 323**: Directs GSA to establish minimum EE & RE performance for leased space; requirements for energy efficient lighting in Federal buildings



- **Office of High Performance Green Federal Buildings** established within GSA to:
 - Coordinate w/ DOE's Office of Commercial H-PGreen Bldgs & other agencies
 - Identify and reassess improved or higher rating standards every 5 years
 - Disseminate info and promote results of R&D relating to Green Buildings
 - Identify and develop Green Building standards for all types of federal facilities
 - Establish green practices to be used throughout life of a federal facility
 - Identify opportunities to demo innovative and emerging Green Building technology
 - Analyze budget practices & LCC issues, recommend changes to Congress
 - **Sec 441** – Building life cycle cost analysis increased from 25 to 40 years
 - FEMP Guidance: <http://www1.eere.energy.gov/femp/program/lifecycle.html>
 - Establish Federal High-Performance Green Building Office and Advisory Committee...



Predevelopment hydrology shall be maintained or restored:

- To the maximum extent technically feasible
- By the sponsor of any development or redevelopment project
- Involving a federal facility with a footprint over 5,000 square feet
- Using site planning, design, construction and maintenance strategies



- **Sec 440** – \$4 Million per year for 2008-2012 to implement Sections 434-439
- **Sec 453** – Data Centers: Voluntary National Information Program to be established within 90 days by EPA and others
- **Sec 491** – 1 demonstration project per year of green features in a Federal building from 2009 to 2014, project must:
 - Provide measureable elements to aid research
 - Achieve the highest rating offered by the high performance green building system (i.e. LEED Platinum)
- **Sec 523** – Requires 30 percent of the hot water demand in new Federal buildings (and major renovations) to be met with solar hot water equipment, provided it is life-cycle cost-effective



Renewables

- At least half of the statutorily required renewable energy (7.5% by FY 2013) from new renewable sources (EO, EPACT)
 - http://www1.eere.energy.gov/femp/pdfs/epact05_fedrenewenergyguid.pdf

Water

- Reduce water consumption intensity 16 % by the end of FY 2015 (EO)
 - http://www1.eere.energy.gov/femp/pdfs/water_guidance.pdf

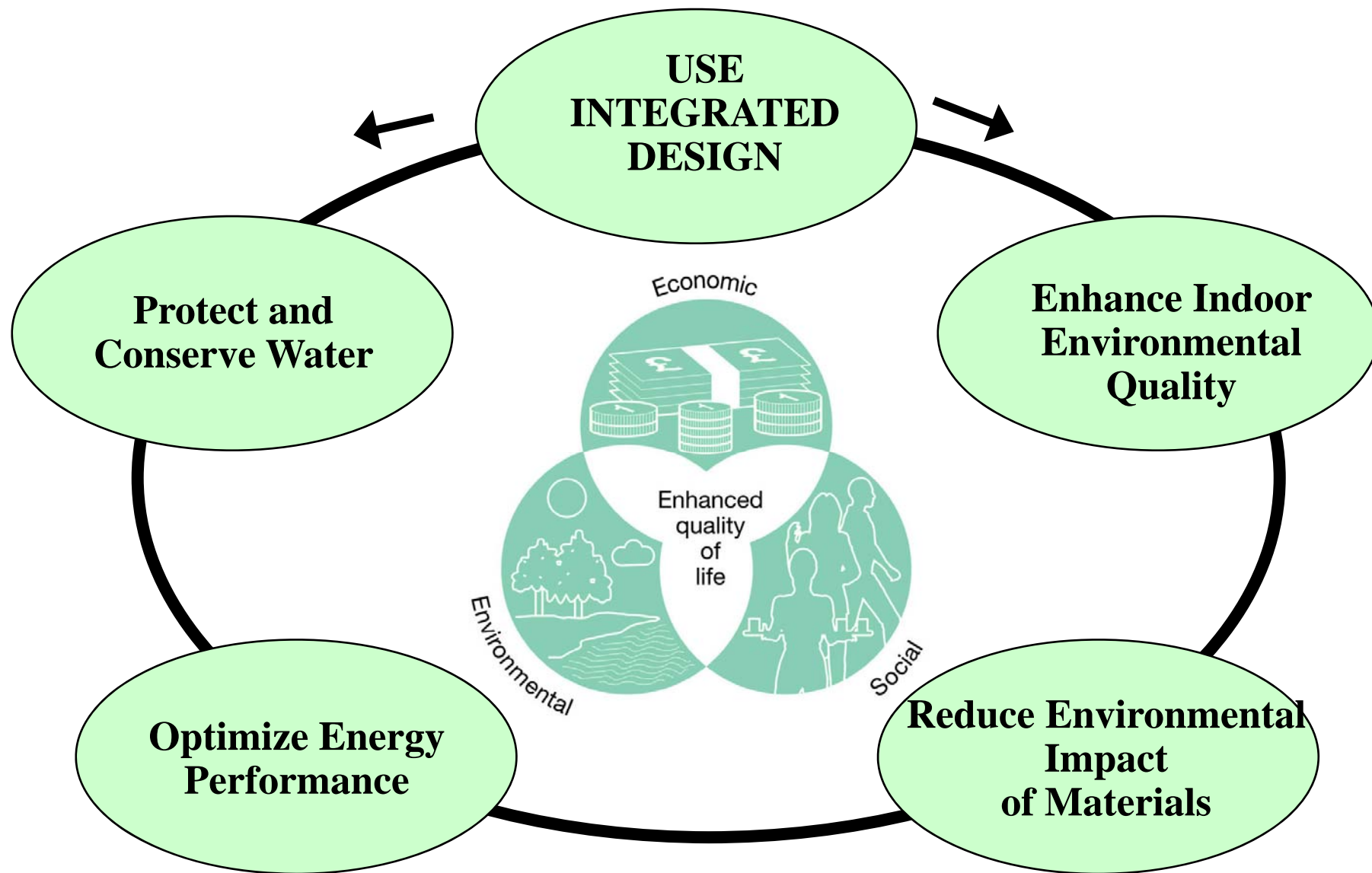
Green Buildings

- NC/MR to comply with the Guiding Principles
- 15% of existing building inventory must comply by the end of FY 2015
 - http://www.wbdg.org/references/sustainable_eo.php
- Other EO sections on Electronics Stewardship, Green Product Acquisition, Pollution Prevention, and Solid Waste Diversion/Recycling



1. Updates the Guiding Principles for Sustainable New Construction and Major Renovations
2. Establishes a separate Guiding Principles for Sustainable Existing Buildings
3. Clarifies reporting guidelines for entering information on Sustainability Data Element #25 in the Federal Real Property Profile (FRPP) database, and
4. Explains how to calculate the percentage of buildings/square footage that are compliant with the Guiding Principles.
Application of the Guiding Principles to Existing Buildings

** Guidance to be updated, at a minimum, every 2 years*





Employ Integrated Design Principles

Integrated Design

- Use integrated teams in all stages of a project
- Establishes performance goals for siting, energy, water, materials, and indoor environmental quality
- Considers all stages of the building's lifecycle, including deconstruction

Commissioning

- Employ commissioning practices tailored to the size and complexity of the building
- Includes an experienced commissioning provider, inclusion of commissioning requirements in construction documents, a commissioning plan, verification of the installation and performance of systems to be commissioned, and a commissioning report.



Optimize Energy Performance

Energy Efficiency

- Establish a whole building performance target.
- Design to earn ENERGY STAR.
- For new construction, reduce the energy use by 30 percent compared to the baseline building performance rating per ASHRAE Std 90.1-2007.
- For major renovations, reduce the energy cost budget by 20 percent below pre-renovations 2003 baseline.
- Use Labs21 where applicable

Commissioning

- Install building level utility meters in construction and renovation projects.
- Verify that building performance meets or exceeds the design target, or that actual energy use is within 10% of the design energy budget for all other building types (preferred use of Energy Star Portfolio Manager).



Protect and Conserve Water

Indoor Water

- Reduce indoor potable water use by a minimum of 20%

Outdoor Water

- Reduce outdoor potable water use by a minimum of 50%
- Reduce storm water runoff and polluted site water runoff (EISA section 438)
- Specify EPA's WaterSense-labeled products or other water conserving products, where available



Enhance Indoor Environmental Quality

During Construction

- SMACCNA IAQ Guidelines for Occupied Buildings under Construction, 2007
- Prior to occupancy, conduct a minimum 72-hour flush-out

During Occupancy

- ASHRAE 55-2004, Thermal Env. Conditions
- ASHRAE 62.1-2004, Ventilation for Acceptable IAQ
- Implement a moisture control strategy
- Achieve a minimum daylight factor of 2 percent in 75% of occupied space
- Provide lighting controls and appropriate glare control
- Specify materials and products with low pollutant emissions
- No smoking within 25 feet of building



Reduce Environmental Impact of Materials

- Use materials with recycled content (RCRA Sec. 6002), biobased content (FSRIA Sec. 9002), and environmentally friendly products (recommendations in Federal Green Construction Guide for Specifiers on WBDG)
- Recycle or salvage at least 50 percent construction, demolition, and land clearing waste, excluding soil
- Eliminate the use of ozone depleting compounds



- Interagency cooperation managed by NIBS
- Design Guidance focused on Federal facilities
- Federal Green Construction Guide for Specifiers
- *7 FREE* Continuing Education courses
- July 2008: 56,000 downloads *per day*

WBDG The Gateway to Up-To-Date Information on Integrated 'Whole Building' Design Techniques and Technologies
WHOLE BUILDING DESIGN GUIDE
...over 230,000 users and 1.6 million downloads a month

About / Contact

Design Guidance Project Management Operations & Maintenance Documents & References

The Whole Building Design Approach

The goal of 'Whole Building' Design is to create a successful high-performance building. To achieve that goal, we must apply the integrated design approach and the integrated team approach to the project during the planning and programming phases. [Read more](#)

WBDG Focus

New National BIM Standard Released

The NBIMS Executive Committee has released the National BIM Standard Version 1 - Part 1: Overview, Principles, and Methodologies for public use. This document, which includes contributions by more than thirty subject-matter experts in the capital facilities industry, incorporates industry comments and now contains new and expanded information about the NBIMS production and use process. [Read more](#)

Services

Construction Criteria Base

Popular Links

- [Construction Waste Management Database](#)
- [Building Envelope Design Guide](#)
- [Executive Order 13423 Technical Guidance](#)
- [Federal Green Construction Guide for Specifiers](#)
- [Unified Facilities Criteria](#)
- [Unified Facilities Guide Specifications \(UFGS\)](#)

New and Updated Pages

[Mechanical Insulation Design Guide](#)
The National Institute of Building Sciences (NIBS) Mechanical Insulation Committee (NMIC) has developed the Mechanical Insulation Design Guide (MIDG) to provide a comprehensive source of information on the performance and standardization of mechanical insulation in buildings.

News and Events

BIM Storm Hits LA

On January 31, 133 design professionals from 11 countries participated in an online design charrette in which another 700 people were invited to participate.

New Version of the United States National CAD Standard

AIA, CSI and NIBS unveil version 4.0 with greater enhancements. [Read more](#)

Periodicals

www.wbdg.org



FEMP's High Performance Federal Buildings Database: 46 Federal Case Studies

BT's High Performance Buildings Database: 106 Total Case Studies

Address: <http://www.eere.energy.gov/femp/highperformance/>

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FEMP

Federal Energy Management Program

About the Program | Program Areas | Information Resources | Financing Mechanisms | Technologies | Services | Home

High Performance Federal Buildings

Using the Database

Search by Project Name

Search by Owner

Search by Location

Search by Building Type & Size

List All Projects

Detailed Search

Many federal facilities have succeeded in creating high performance buildings that save energy and reduce the environmental impact on our lives. We have captured a sampling of these successes in this High Performance Federal Buildings Database, a database showcasing examples of sustainable building projects in the federal government. Use the database to examine project details or to explore some construction or retrofit ideas for your facility.

FEMP is sponsoring this federal portal to the High Performance Buildings Database. FEMP also supports the [Interagency Sustainability Working Group](#). This database contributes to the working group's purpose of exchanging information about federal agency sustainable design activities as demonstrated in these high performance federal building projects. The High Performance Buildings Database is research sponsored by the U.S. Department of Energy; it seeks to improve building performance measuring methods by collecting data on various factors that affect a building's performance, such as energy, materials, and land use. The database includes information from buildings around the world, ranging from homes and commercial interiors to large buildings and even whole campuses and neighborhoods. These may be certified "green" projects, or simply projects that have one or more notable environmental features. The information has been reviewed for consistency and presentation, but in most cases, the details have not been independently verified.

To find projects of interest, use any of the search options listed on the left or select "High Performance Buildings" from the active list. Each project description page...

www.eere.energy.gov/femp/highperformance

Address: www.eren.doe.gov/buildings/highperformance/

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High Performance Buildings

An Initiative of the U.S. Department of Energy Building Technologies Program

Related Topics

[Buildings Database](#)

[Performance Metrics](#)

See [Residential building information](#)

[Building industry's technology roadmap](#)

[Green Building Challenge](#)

[Laboratory implementation](#)

About High Performance Buildings

- Design Approach: Whole-building design, costs and benefits
- Toolbox: Design guidelines, software, and resources
- Technologies: Methods, materials, and equipment

About the High Performance Initiative

- Goals and Objectives: Overview of the Initiative
- How to Participate: Criteria, application, and contact information
- Research Projects: Case Studies, Performance Metrics, and High-Performance Buildings Database

News & Events

Jun 2003 National Building Museum Presents

The US Department of Energy is proud to sponsor "Big and Green," an exhibit at the National Building...

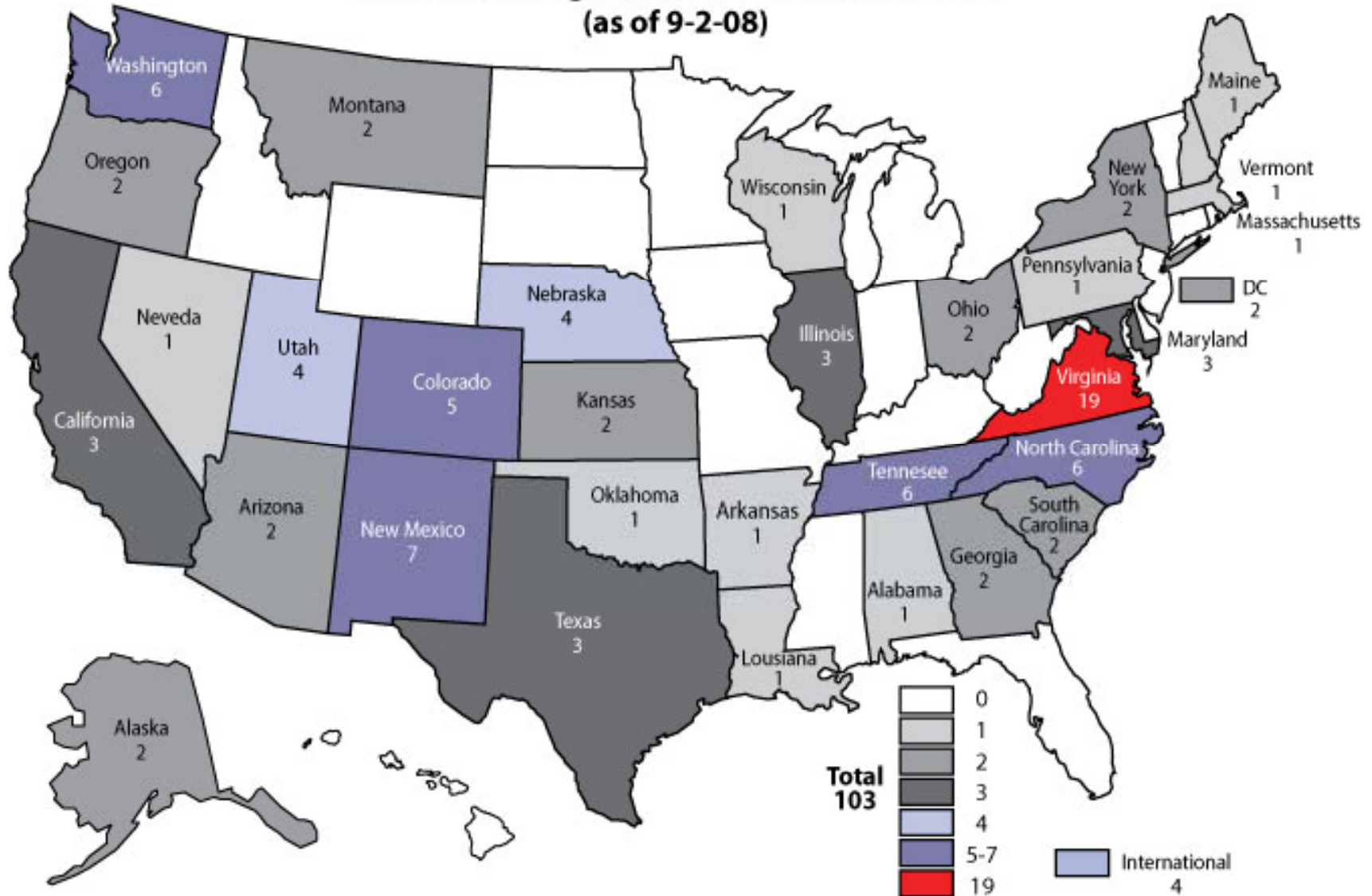
[News & Events](#)

www.eere.energy.gov/buildings/database/



103 Federal LEED Buildings!

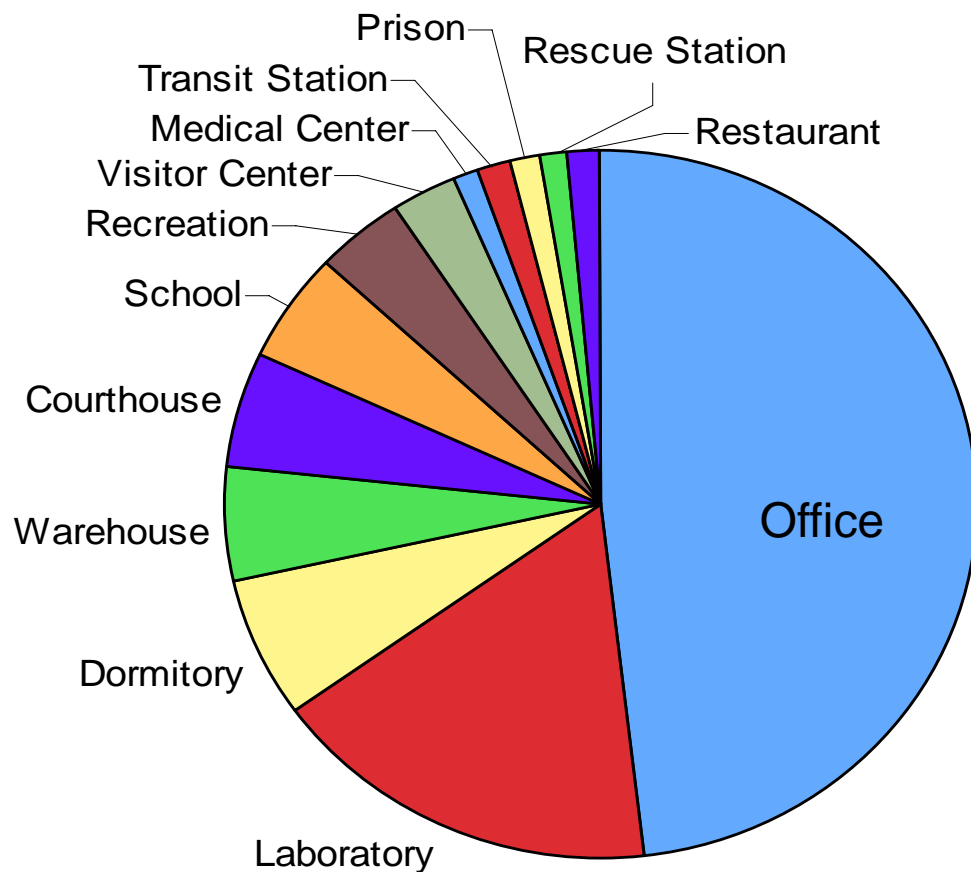
**Federal Buildings Awarded LEED Certification
(as of 9-2-08)**



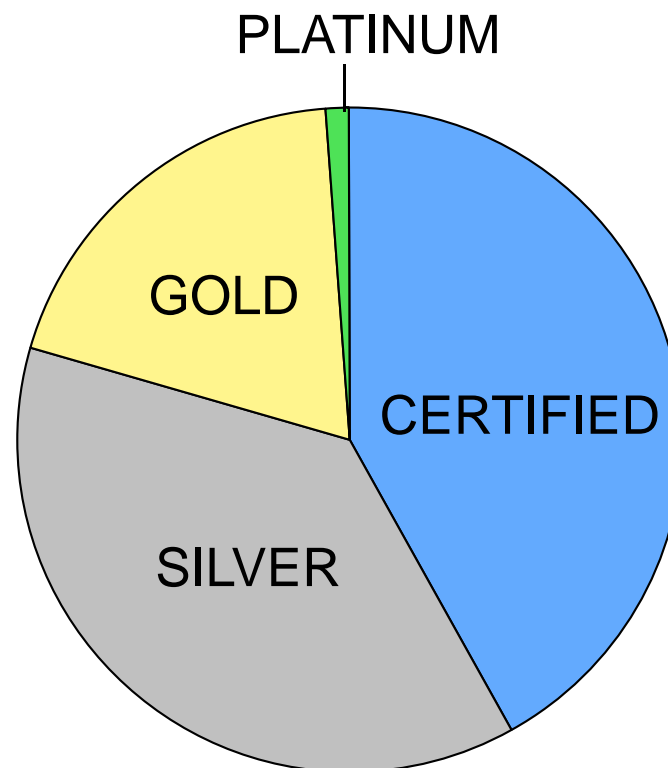


Federal LEED Building Breakdown

By Building Type



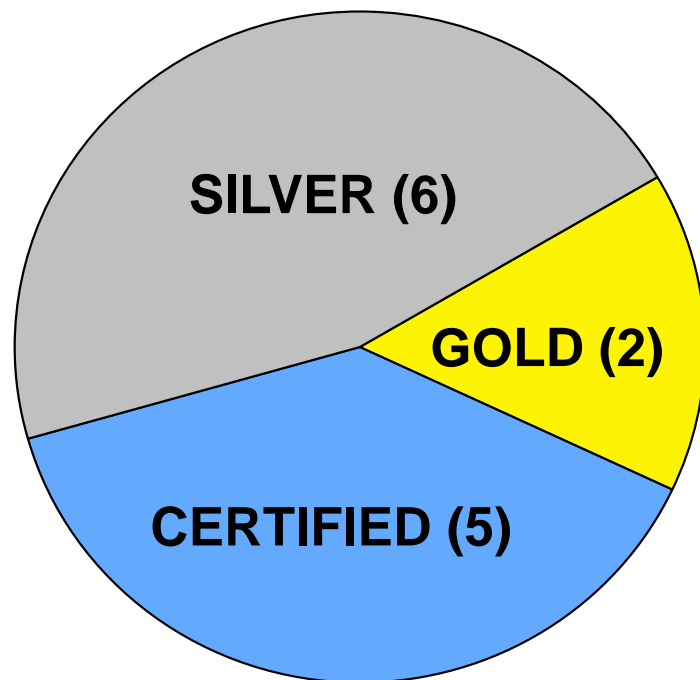
By Certification Level



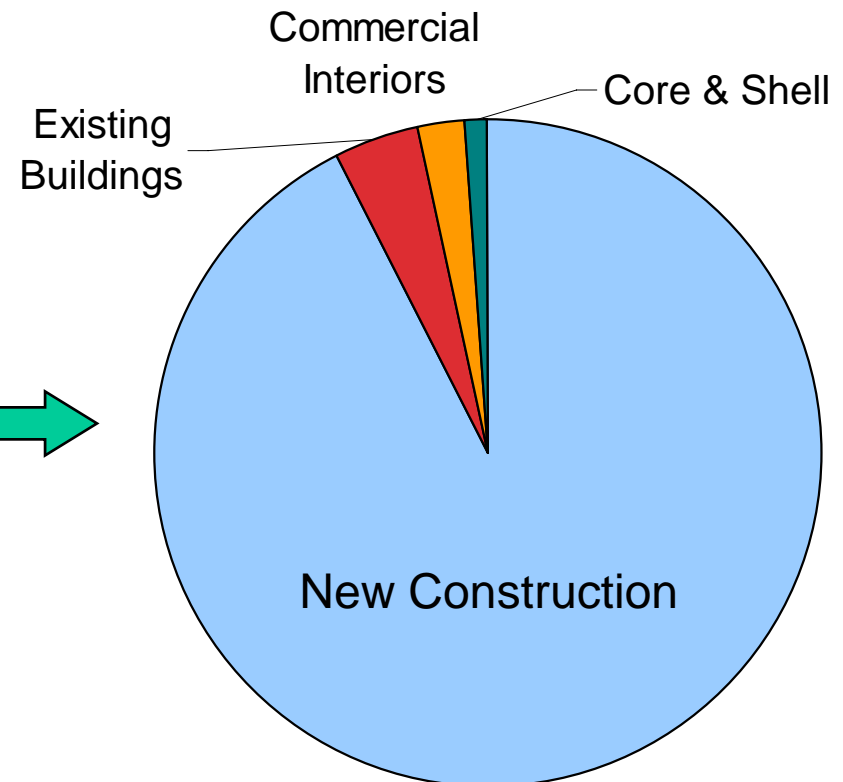


Agency LEED Policies for New Construction

Agency LEED-NC Policies



By Rating System



GOLD: DOE, EPA

SILVER: NASA, State, Army, DOC, USDA, Navy

CERTIFIED: GSA, Pentagon, SI, AF, HHS*

* Specifies the usage of LEED or Green Globes



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Thank You!

Matt Gray

DOE/FEMP

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www.fedcenter.gov

www.wbdg.org/sustainableEO

www.wbdg.org/design/greenspec.php

<http://www1.eere.energy.gov/femp/sustainable/>

www.eere.energy.gov/femp/highperformance/index.cfm